STOCHASTIC AIRSPACE SIMULATION TOOL DEVELOPMENT
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Abstract

Modeling and simulation is often used to study the physical world when observation may not be practical. The overall goal of a recent and ongoing simulation tool project has been to provide a documented, lifecycle-managed, multi-processor capable, stochastic simulation capability enabling analysis of procedures and equipment for aircraft flight in the national airspace system (NAS). The tool is a Monte Carlo-based computer simulation program that contains the stochastic models of most components of the NAS, including navigation aids, surveillance systems, pilots, aircraft, air traffic controllers, and weather. It is also combined with discrete artifacts such as FAA database-supplied runway sizes and configurations, and obstacles. In addition, the tool possesses a fast-time airframe-typespecific kinematic aircraft model, a high-performance random number generator, a precise WGS-84-compliant elliptical earth model, and a graphical user interface integrating world-wide photo-realistic airport depictions and real-time three-dimensional animation.

This paper presents an overview of the software tool and its formulation, including programming languages, environments, and other development tools; selection, design, and implementation of the mathematical models; and reviews the verification and validation processes.

References


